

REMARKS

In response to the above Office Action, claim 1 has been amended to include the subject matter of claim 10 and claim 10 has been cancelled.

Applicants' invention, therefore, as set forth in amended claim 1 relates to an improvement in a process for the polymerization or copolymerization in the gas phase of olefin(s) by bringing the olefin(s) into contact, under polymerization or copolymerization conditions in a reactor in which the polymer or the copolymer is maintained in a fluidized bed and/or agitated with mechanical stirring, with a catalyst system, the improvement comprising, prior to the introduction of the catalyst system in the reactor, subjecting the reactor to a cleaning treatment that includes the steps of introducing into the reactor an alkane having from 4 to 8 carbon atoms, circulating said alkane across the reactor under pressure and elevated temperature, and then depressurizing and purging the reactor of the alkane, wherein the quantity of alkane used for the cleaning treatment is such that the alkane partial pressure is between 25 and 95% of the saturated vapor pressure of the alkane under the temperature and pressure treatment conditions.

The alkane used in the cleaning treatment of the claimed process is, therefore, necessarily in the vapor phase. This is because if the alkane partial pressure is below the saturated vapor pressure of the alkane under the temperature and pressure treatment conditions as set forth in the claim, the alkane is necessarily in vapor form.

As discussed in the specification, Applicants unexpectedly found that this alkane treatment leads to smooth and improved polymerization start-ups of the polymerization process as shown in the Examples. See page 3, lines 9-15 of the specification.

In the Office Action the Examiner rejected claims 1-16 under 35 U.S.C. §103(a) for being obvious over U.S. Patent No. 4,316,825 to Wirth in view of Durand (EP 0 180420).

Wirth relates to high green strength rubbers, which can be prepared by polymerization in solution or in liquid phase in an inert solvent in the presence of a Ziegler type catalyst (see col. 2, lines 10-18, col. 3, lines 15-17 and Examples 1 and 2 of Wirth).

The Examiner references Example 1 of Wirth as disclosing a rinsing step using hexane in the process. While the Examiner acknowledges that this rinsing step is not at an elevated pressure, he argues that this would be obvious in view of Durand which discloses pressurizing to an elevated pressure and degassing with nitrogen to reduce water content in a gas-phase reactor.

However, it is submitted that Applicants' invention as set forth in main claim 1, is not obvious over this combination of references for the following reasons.

First, Applicants claimed process, as set forth in claim 1, is an improvement in a "process for the polymerization or copolymerization in the gas phase of olefins . . . in a reactor." (Emphasis added).

On the other hand, Wirth does not relate to a gas phase polymerization or co-polymerization process as required by the claims, but to a solution phase process. In contrast, Durand, as the present invention, relates to a gas-phase process. Thus it is not believed there would be any motivation to combine the teachings in respect of the individual reactors and processes of Wirth and Durand in the first place, let alone in the manner in which the Examiner has combined them.

Secondly, Wirth uses the language “rinsing.” While the Examiner argues that this is equivalent to the claimed step of “circulating” the alkane across the reactor, the term “rinsing” by definition means that the alkane is in liquid form. See col. 3, lines 52-53 of Example 1 of Wirth where it is disclosed that the reactor “was assembled, rinsed with dry hexane and purged overnight with dry nitrogen.” Hexane has a boiling point of 69°C and the reactor “overnight” is obviously near or at room temperature. Hence the hexane would have to be in liquid form. In contrast, when the alkane is circulated in the gas-phase reactor in the present invention the alkane is necessarily in vapor form.

The Examiner does not appear to appreciate this difference between the solution polymerization process of Wirth on the one hand and the gas-phase polymerization process of Durand and the invention on the other, because he argues that it would have been obvious, in view of Durand, to perform the “rinsing” of Wirth under pressure and at an elevated temperature. It is apparent that the Examiner has reached this conclusion under the mistaken assumption that both Wirth and Durand relate to polymerization in the “gas phase,” thus apparently believing that the hexane of Wirth could be influenced by the pressure and temperature conditions of Durand. See page 4 of the Office Action, lines 7-13 and last two lines. However, this is not true because Wirth, in contrast to Durand and the present invention, relates only to a polymerization process “in the liquid phase” and the hexane is necessarily in liquid form. Moreover, what advantage or difference would occur if the rinsing step of Wirth with a liquid alkane was done under pressure? Thus it is submitted that circulating with alkane vapor is not the same as rinsing with liquid alkane.

Thirdly, Durand's pressurizing/depressurizing steps relate to the nitrogen purge of the reactor, not an alkane. Thus even if a skilled person was somehow able to combine Wirth and Durand, they could not arrive at the present invention. More specifically, the liquid rinsing of Wirth is clearly a pre-purge step, performed immediately after assembling the reactor and before a conventional nitrogen purge to remove air (overnight in the case of the Examples). Durand, when describing the start-up of the polymerization reactor at page 18, lines 29-35, describes a reactor already assembled and under a nitrogen atmosphere, which is then subject to nitrogen purge operations. Thus, were the skilled person to understand anything from the teachings of Durand regarding the use of purges in a reactor according to Wirth, it would be that the "pressurized" nitrogen purges of Durand could be performed instead of or after the overnight nitrogen purge at atmospheric pressure taught by Wirth.

There is nothing in Durand that teaches how one could modify the liquid alkane rinsing step of Wirth to arrive at Applicants claimed circulating step with alkane in vapor form. To suggest it could be used with the pressuring/depressuring steps that Durand uses with nitrogen, is not only hindsight based on reading of Applicant's specification, but would make no sense because the alkane is in liquid form. As noted in M.P.E.P §2142 "impermissible hindsight must be avoided and the legal conclusion [of obviousness] must be reached on the basis of facts gleaned from the prior art." (Emphasis added).

Neither Wirth nor Durand teach the use of an alkane in vapor form in a cleaning treatment for a gas phase reactor. This is not only a key feature of Applicants' invention, but is not gleanable from either reference. Thus a claimed element is clearly

missing from the cited references and there is no discussion about this in the Examiner's rejection.

It is submitted, therefore, that the Examiner has not "clearly articulated" all of the reasons required to establish a prima facie case of obviousness as required by M.P.E.P. §2142.

Withdrawal of the rejection under §103(a) based on Wirth in view of Durand and allowance of claims 1-9 and 11-16 is therefore requested.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 

Arthur S. Garrett
Reg. No. 20,338
(202) 408-4091

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